

WHAT IS CLAIMED IS:

1. A system for calibrating a spatial light modulator array comprising:
 - an illumination system;
 - a spatial light modulator array that modulates light from the illumination system;
 - a projection optical system that images the spatial light modulator array onto an image plane;
 - a shearing interferometer that creates an interference pattern in the image plane; and
 - a controller modulating elements of the spatial light modulator array.
2. The system of claim 1, wherein the shearing interferometer includes any of a diffraction grating, a prism, and a folding mirror for generating shear.
3. The system of claim 1, wherein the shearing interferometer is a lateral shearing interferometer.
4. The system of claim 1, wherein the shearing interferometer is a stretching shearing interferometer.
5. The system of claim 1, wherein the shearing interferometer is a rotational shearing interferometer.
6. The system of claim 1, wherein the projection optics resolves each element of the spatial light modulator array in the image plane.
7. The system of claim 1, wherein the controller modulates alternate columns of elements of the spatial light modulator array.

8. The system of claim 1, wherein the shearing interferometer includes a diffraction grating with a pitch corresponding to a shear of the light by an integer number of elements of the spatial light modulator array.

9. The system of claim 1, wherein the shearing interferometer includes a diffraction grating with a pitch corresponding to a shear of the light by a fractional number of elements of the spatial light modulator array.

10. The system of claim 1, wherein the controller controls any of tilting, pistoning, and deformation of the elements.

11. The system of claim 1, further including a CCD detector in the image plane for detecting the interferogram.

12. The system of claim 11, wherein the CCD detector includes a plurality of detector cells corresponding to each element of the spatial light modulator array.

13. The system of claim 1, wherein the spatial light modulator array is a reflective spatial light modulator array.

14. The system of claim 1, wherein the spatial light modulator array is a pistoning-type spatial light modulator array.

15. The system of claim 1, wherein the spatial light modulator array is a tilting micromirror-type spatial light modulator array.

16. The system of claim 1, wherein the spatial light modulator array is a transmissive spatial light modulator array.

17. A method for calibrating a spatial light modulator array comprising:

- generating light from an illumination system;
- modulating the light using a spatial light modulator array;
- passing the light through a projection optical system so as to image the spatial light modulator array onto an image plane;
- shearing the light so as to create an interference pattern in the image plane;
- detecting the light in the image plane so as to measure interference fringes; and
- modulating the spatial light modulator array while repeating the detecting step.

18. The method of claim 17, wherein the shearing step includes shearing the light using any of a diffraction grating, a prism and a folding mirror.

19. The method of claim 17, wherein the shearing step includes shearing the light using a stretching shearing interferometer.

20. The method of claim 17, wherein the shearing step includes shearing the light using a rotational shearing interferometer.

21. The method of claim 17, applying the projection optics to resolve each element of the spatial light modulator array in the image plane.

22. The system of claim 17, wherein the shearing step includes shearing the light using a diffraction grating with a pitch corresponding to a shear of the light by an integer number of spatial light modulator array elements.

23. The system of claim 17, wherein the shearing step includes shearing the light using a diffraction grating with a pitch corresponding to a shear of the light by an fractional number of spatial light modulator array elements.